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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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09/368,201 08/04/99 KNOPLIOCH

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TM02/1010

EXAMINER

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JONES, H

ART UNIT PAPER NUMBER

2123

DATE MAILED:

10/10/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

| | | |
|------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 09/368,201 | Applicant(s) Knoploch et al. |
| | Examiner Hugh Jones | Art Unit 2123 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on Jul 25, 2001
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle* 1035 C.D. 11; 453 O.G. 213.
- Disposition of Claims**
- 4) Claim(s) 1-15 and 17-20 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-15 and 17-20 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on Aug 4, 1999 is/are objected to by the Examiner.
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) All b) Some* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) Notice of References Cited (PTO-892) 18) Interview Summary (PTO-413) Paper No(s). _____
- 16) Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) Notice of Informal Patent Application (PTO-152)
- 17) Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 20) Other: _____

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DETAILED ACTION

Introduction

1. Claims 1-15 and 17-20 of U. S. Application 09/368,201, filed 04-August-1999, are presented for examination. Applicants are thanked for their amendment and arguments.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the method must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Applicants have only shown geometric features in the drawings but are claiming a method to generate the features.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. **Claims 1-15 and 17-20 respectively, are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either an asserted utility or a well established utility.**
Applicant's specification has been carefully reviewed. The Examiner respectfully submits that Applicant's have not claimed (nor shown evidence of) a practical application.

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5. An invention which is eligible for patenting under 35 U.S.C. § 101 is in the “useful arts” when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. *The fundamental test for patent eligibility is thus to determine whether the claimed invention produces a “useful, concrete and tangible result.”* The test for practical application as applied by the examiner involves the determination of the following factors:

(1) “Useful” - The Supreme Court in *Diamond v. Diehr* requires that the examiner look at the claimed invention as a whole and compare any asserted utility with the claimed invention to determine whether the asserted utility is accomplished. Applying utility case law the examiner will note that:

- (a) the utility need not be expressly recited in the claims, rather it may be inferred.
- (b) if the utility is not asserted in the written description, then it must be well established.

(2) “Tangible” - Applying *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. § 101. In *Warmerdam* the abstract idea of a data structure became capable of producing a useful result when it was fixed in a tangible medium which enabled its functionality to be realized.

(3) “Concrete” - Another consideration is whether the invention produces a “concrete” result. Usually, this question arises when a result cannot be assured. An appropriate rejection

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under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

6. The Examiner respectfully submits that the claimed invention does not recite a *concrete, useful or tangible result*. Consequently, for purposes of art rejections, the specification will be interpreted to the best of the Examiner's ability.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. **Claims 1-15 and 17-20 are also rejected under 35 U.S.C. 112, first paragraph.**

Specifically, since the claimed invention is not supported by either an asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

- The independent claim recites calculating the volume. However, there does not appear to be a teaching in the specification directed at any such calculation.

- Applicants have not disclosed details directed at obtaining and using images (see claim 2, for example).

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1-15 and 17-20 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: The independent claim recites calculating the volume. There is a gap between tesselating (iteratively refining the mesh to a contour) and the step of calculating a volume.

Claim Interpretations

11. The Examiner has referred to the specification as well as the claims in order to determine Applicant's invention. The broadest reasonable interpretation of the claim language has been given to claims 1-15 and 17-20. Applicants appear to be disclosing triangular (see limitation b, claim 1, which recites "three segments") mesh generation and iterative refinement of said grid to more accurately match a shape/contour.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

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13. Claims 1-15 and 17-20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Tata et al. or Bala et al..

14. Tata et al. disclose a device for automating operation of a stereolithography apparatus uses an STL file as an input and includes a programmable computer, a facet processor that sorts the facets of the STL file according to a predetermined slice axis. The facet processor also groups the sorted facets according to those having common minimum vertex values with respect to the slice axis. The facet processor also subgroups the grouped facet file according to facets having common maximum vertex values with respect to the slice axis. A key characteristic identifier identifies key characteristics of the STL file. A thickness calculator determines the thickness of each layer of the model according to a geometrical error of preselected magnitude. A slicer calculates the intersection of each sliced plane by the calculated thickness. A directional ordering device insures uniformity with the direction of each other contour that defines the intersection. A model generator uses the layer thickness and intersection information to generate a portion of a model. An interface device controls the operation of the machine based on the model that is generated. See figures 1, 8, 20, 22, 26 and associated text.

15. Bala et al. disclose methods and apparatus are for generating isosurfaces, given input data that includes (1) the representation of a set of points in three-dimensional space; (2) connectivity information with respect to the set of points and (3) a scalar field. The methods and apparatus allow the desired isosurfaces to be produced efficiently on all hardware platforms, including those not equipped to rapidly generate such isosurfaces using normally computation

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intensive processes, by utilizing a precomputed isofacet configuration table and predefined tetrahedron component labeling data (preset relationships among the vertices, edges and faces of a tetrahedron). Further aspects of the methods and apparatus include (1) methods and apparatus which support the selective display of isosurface and contour line images, and (2) methods and apparatus which utilize parallel processing techniques to enhance the efficiency of the isosurface generation process. See figure 10 and associated text.

16. Claims 1-15 and 17-20 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Hoppe or Akiyama (of record) or Sakaguchi et al..

17. Hoppe discloses a method and system for adaptively refining an arbitrary progressive mesh representation for a graphical geometric model according to changing view parameters is presented. The method uses efficient selective refinement criteria for view-dependent parameters based on the view frustum, surface orientation, and screen-space geometric error to produce graphical objects and images such as a graphical terrain. A real-time method for incrementally refining and coarsening the mesh according to the selective refinement criteria is also presented. The real-time method exploits graphical view coherence, and supports frame rate regulation. For continuous motions, the real-time method can be amortized over consecutive frames, and smooth visual transitions (geomorphs) can be constructed between any two adaptively refined meshes used to represent a graphical object or image. See figures 4, 7, 10, 28 and associated text.

18. Akiyama disclsoes a method for eliminating intersections between a substance boundary and triangles (or tetrahedra) of a triangle mesh (or tetrahedron mesh) which satisfies a condition

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set as nodes. Finally, mesh elements are generated for each block using the nodes. See figures 33-34 and associated text.

Response to Arguments

20. Applicant's arguments filed 7/25/2001 have been fully considered but they are not persuasive.
21. Note that all arguments are moot in view of the newly applied rejections.

Conclusion

22. **Any inquiry concerning this communication or earlier communications from the examiner should be:**

directed to:

23. Dr. Hugh Jones telephone number (703) 305-0023, Monday-Thursday 0830 to 0700 ET, *or* the examiner's supervisor, Kevin Teska, telephone number (703) 305-9704. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

mailed to:

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or faxed to:

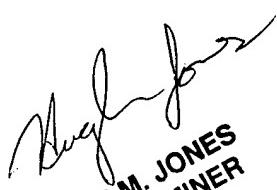
(703) 308-9051 (for formal communications intended for entry) **or**

(703) 308-1396 (for informal or draft communications, please label “*PROPOSED*”

or “*DRAFT*”).

Dr. Hugh Jones

October 8, 2001



DR. HUGH M. JONES
PATENT EXAMINER
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